

# Appalachian Farming Systems Research Center

*"Promoting sustainable pasture systems"*



## Increasing Forage Production

Vigorous grassland supports cattle, sheep, and goat production that contributes to a healthy farm economy



Timing of harvest is critical for optimizing nutritive value and animal performance, hence these cattle are being rotationally grazed so that the farmer controls the harvest.



Sheep and meat goats grow faster when grazed on high-quality pasture than when offered poor forage.

### Correct grass management helps control water runoff and erosion on slopes



This slope is slipping as result of poor plant cover.



A well-grassed slope stabilizes soil and helps water soak slowly into ground instead of running off, while simultaneously producing feed for livestock.



A rhino beetle, shown here with her nest, helps recycle nutrients by speeding decay of plant residues.

Red-backed salamanders are indicative of a healthy ecosystem and co-exist with silvopastoral systems.

The common slug is an intermediate host for the meningeal worm parasite that can kill sheep and goats.

## Alleviating Soil Problems

Appalachian soils are acidic and are sometimes infertile, shallow, and located on steep slopes. Developing management systems that overcome these limitations helps farmers to make optimal use of limited land and water resources.



The larger plants have responded to the addition of neutralizing lime.

Steep slopes are prone to erosion and dangerous for the use of farm machinery. Early homesteaders tilled these slopes with often unfortunate results. Conversion of these sites to silvopastoral systems for combined tree and forage production will allow the sustainable use of some hill lands.



These steep slopes are being managed for production of both wood and forage.

Nitrogen is a plant nutrient often supplied as a fertilizer. However, some plants (legumes) do not need this fertilizer because they can use nitrogen from the air. Bacteria from root nodules are needed for this use. Research contributes to the successful incorporation of legumes into pastures.



A nodule is being monitored by instruments in a physiological study.

Organic matter in soils confers benefits including increased water and nutrient holding capacity, improved aeration, and reduced activity of toxicants. The chemical components of plants determine the rate of decomposition and accumulation of organic matter.



Plant decomposition is being monitored in these litter-bags on the forest floor.

## Integrating Management of Pastures and Woodlots

Topography, climate, and soil limitations present livestock management challenges to Appalachian farmers. Silvopastoral systems address these challenges while helping to maintain the ecological integrity of the native landscape.

Trees have adapted to thrive in spite of the diverse challenges presented by Appalachian landscapes. Silvopastoral systems are being studied to enhance forage production in a tree-dominated ecoregion.



By integrating pastures and trees, we hope to enhance forage growth and extend the grazing season to grow larger, healthier animals, while at the same time allowing farmers to become more competitive in the marketplace.



Being situated in the 'Birthplace of Rivers' for the eastern United States, our research is committed to maintaining a safe, reliable water supply. Silvo-pastoral systems might offer a means to achieve that goal.



Photo courtesy of ARS

Photo courtesy of NRCS

## Developing Alternative Products for Small Farms

Livestock is a major source of income for Appalachian farmers. However, small farm size limits competition with larger producers in the midwest. Grassland based production systems that target high-value niche markets provide economic benefits to the region while helping to retain the integrity of the rural landscape.



Our research brings together a team of scientists from USDA-ARS, West Virginia University, Virginia Tech, and the University of Georgia to develop systems to produce market-ready beef entirely on pasture and forage in the Appalachian Region.

High-value specialty livestock and crops diversify small farms and provide new economic opportunities.



Pastures can be used to produce high quality, low cost forages for meat goats



Medicinal plants offer opportunities to develop products that control internal parasites in goats to improve health and animal performance.



Pasture raised meats, such as beef, lamb, and goat provide low fat, low calorie options for today's consumers.